Serial No. sn

R E M A R K S

Multiple dependent claims have been eliminated to avoid payment of the multiple dependent claim fee. The abstract of the disclosure and claims have also been amended to conform with U.S. practice, without any effect on the patentability thereof. Entry is in order.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,

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Serial No. sn

MARKED UP VERSION SHOWING CHANGES

1. A method <u>of</u> [for] switching [the] video component(s) of a first digital audio-visual program onto [the] video component(s) of a second digital audio-visual program, each video component <u>including</u> [being constituted, as seen] in the order of presentation, [by] an ordered sequence of pictures which are either Intra pictures (denoted by I) or predictive pictures (denoted by P) or bidirectional pictures (denoted by B), each Intra picture referring to no other picture, each predictive picture referring to the Intra picture or to the predictive picture preceding it, each bidirectional picture being able to refer to two non-bidirectional pictures Intra or P, either to the Intra picture or to the predictive picture preceding it or to the Intra picture or the P picture following it, or to a combination of the two preceding or following Intra or predictive pictures,

[characterized in that]

<u>the</u> [said] method <u>comprising</u> [consists in] <u>(a)</u> switching at a switching time following the end of a picture of the first program after the switch command onto the picture of the video component of the second program which is present at said time and <u>(b)</u> [in] replacing, as seen in the order of transmission, each picture other than Intra of said second program component, where said latter picture is situated between the switching time and the beginning of

the next Intra picture of said second program component, with a picture having [of which] the coding thereof being [is] carried out independently of the picture data of the replaced picture and of the contents of the pictures to which the replacement picture refers.

2. The [M]method of [as claimed in] claim 1, including replacing (a) [characterized in that] the information present in the second-program video component between the time at which the end of a picture of the first-program video component has been encountered after having received the switch command and the beginning of the first picture of the second program [is replaced] with (b) stuffing data.

3. The [M]method of [as claimed in either] of claim[s] 1 [and 2, characterized in that] further including updating the time references of each replacement picture[are updated].

4. The [M]method [as claimed in one of the above claims,] of claim 1 further including retrieving the information relating to the minimum delay Vbv before it is possible to decode a picture from the replaced picture [characterized in that the information relating to the minimum delay Vbv before it is possible to decode a picture is retrieved from the replaced picture] and moving the

information relating to the minimum delay Vbv before it is possible to decode a picture from the replaced picture [moved] into each corresponding substitution picture unless it be equal to 'FFFF in the other pictures of said second program component, in which latter case it assumes the value 'FFFF.

5. The [M]method of [as claimed in one of the above claims, characterized in that] claim 1 wherein the replacement pictures are included in [constitute] a sequence of bidirectional B pictures all referring to the last predictive P picture of the first-program video component, and further including resetting to a zero value the motion estimating vectors of each of the bidirectional replacement pictures[being set to a zero value].

6. The [M]method of [as claimed in] claim 5, wherein [characterized in that] said replacement B pictures are interleaved pictures comprising a BOTTOM frame and a TOP frame which thereby are similar to digital television pictures and their predictions are field-based predictions, the TOP frames and the BOTTOM frames of said B replacement pictures referring to the single BOTTOM frame of the last predictive picture P of the first-program video component.

7. The [M]method of [as claimed in] claim 1 [through 4, characterized in that] wherein the replacement pictures are included in [constitute] a sequence of pictures which as seen in the direction of transmission includes [consists of] a predictive picture followed by one or more bidirectional pictures, the predictive replacement picture P referring to the last predictive picture P of the first-program video component and each of the bidirectional pictures B referring to said replacement picture P, and setting to a zero value the motion estimating vectors of each of the replacement pictures[being set to a zero value].

8. The [M]method of [as claimed in] claim 1 [through 4, characterized in that] wherein the replacement pictures are included in [constitute] a sequence of pictures which include [consists], as seen in the direction of transmission, [of] alternating predictive and bidirectional pictures, the first predictive replacement picture P referring to the last predictive picture P or Intra picture I of the first-program video component, then each following predictive replacement picture P referring to the predictive picture P which precedes it, and each bidirectional replacement picture B referring only to the predictive picture P which precedes it, the number of bidirectional pictures B between two predictive pictures P being equal to that encountered in the

first-program video component, and the motion estimating vectors of each replacement picture being set to a zero value.

9. The [M]method [as claimed in either] of claims 7 [and 8, characterized in that] wherein said replacement pictures are frame pictures comprising a TOP frame and a BOTTOM frame which thereby are similar to a digital television picture and their predictions are field-based predictions, the TOP and BOTTOM frames of the first predictive replacement picture P referring to the single BOTTOM frame of the last predictive picture P or I of the first-program video component and the TOP and BOTTOM frames of the following bidirectional B or predictive P pictures referring to the BOTTOM frame of the first predictive replacement picture P.

10. The [M]method of [as claimed in] claim 1 [through 4, characterized in that] wherein the replacement pictures are included in [constitute] a sequence of pictures which consists as seen in the order of transmission of a first picture which is an Intra picture, the other pictures being an alternation of bidirectional and predictive pictures, the first predictive replacement picture P referring to the Intra picture, then each following predictive replacement picture P referring to the predictive picture P which precedes it, and each bidirectional replacement picture B only referring to the predictive picture P or

the Intra picture I which precedes it, the number of bidirectional pictures B between two predictive pictures P being equal to that encountered in the first-program video component, and setting to a zero value the motion estimating vectors of each replacement picture [being set to a zero value] except for the Intra picture which lacks motion estimating vectors.

11. The [M]method of [as claimed in] claim 10 wherein [, characterized in that] said replacement pictures are frame pictures comprising a TOP frame and a BOTTOM frame which thereby are pictures similar to those of digital television, and the predictions of the bidirectional pictures B and the predictive pictures P being field-based predictions, the TOP and the BOTTOM frames of the P or B replacement pictures which follow the picture I referring to the BOTTOM frame of the I or P replacement picture which precedes it.

12. The [M]method [as claimed in one] of claim[s] 5 [through 11, which is implemented in] wherein the method is performed with a transmission system for transporting [wherein] said pictures by transport packet streams, each transport packet stream including [constituting] video components of the first and second programs, [are transported by transport packet streams,] each transport packet TP including [being fitted with] a payload unit start PUSI

indicator which, when set at 1, indicates that said packet contains the beginning of a packetized elementary stream PES packet, the PES packets being aligned with the beginning [the] payloads of the transport packets TP, each PES packet containing only one picture, [wherein said transmission system] certain transport packets [are intended] in said transmission system being arranged to carry [transport information such as] a random access transport indicator RAI which, when set at 1, denotes that the next transport packet moving this component contains the first data of a video sequence, the method further comprising

[characterized in that

said method consists]

[--]determining the first transport packet TP of the first-program video component after the switch command[,] said packet comprising a random access indicator RAI set at 1 in order to determine the time of switching onto the second program,

[--]switching onto said second-program video component and replacing the transport packets TP of this video component with stuffing transport packets until the appearance of the following transport packet TP of which the PUSI indicator is set at 1,

[--]within this transport packet TP of which the PUSI indicator is set at 1 and if the RAI indicator is not set, replacing the PES packet header situated at the beginning of the payload with a reconstructed PES packet header,

[--]starting with this transport packet and after the PES packet header, replacing the payload data of each transport packet of this component with the replacement picture data, [and]

when all replacement picture data have been inserted into the payload of the video component transport packets TP, replacing the payload data of the following transport packets TP of the component with video stuffing [such as '00 octets] until the appearance of the next transport packet of this second-program video component of which the PUSI indicator is set at 1, this transport packet TP excluded,

[--]then restarting the preceding stage from this transport packet TP with the PUSI indicator set at 1 until the appearance of the next transport packet TP of the second-program video component of which the random access indicator RAI is set at 1, this transport packet excluded,

[--]setting the discontinuity indicator DI at 1 on this packet with random access indicator RAI which corresponds to the end of replacement and to the effective beginning of the second program video.

13. The [M]method of [as claimed in] claim 12, further including [characterized in that when the transport packets TP are scrambled, this method consists in] denoting scrambled transport packets TP [them] in clear while setting the control field of transport scrambling control TSC at the binary value 00.

14. The [M]method of [as claimed in one of] claim[s] 5 [through 11 and being implemented in] wherein the method is performed with a transmission system for transporting [wherein] said pictures by transport packet streams, each including [constituting] the video components of the first and second programs, [are moved by transport packet streams,] each transport packet TP comprising a payload unit start indicator PUSI, which when set at 1, indicates [denotes] that said packet contains the beginning of packetized elementary stream PES packet, the PES packets being aligned with the beginning of the transport packet TP payloads, each PES packet containing only one picture, said transmission system being such that certain transport packets are arranged [are intended] to carry [transport information such as] a

random access transport indicator RAI which, when set at 1, indicates that the next transport packet moving this component contains the first data of a video sequence,

[characterized in that]

the [said] method further comprising[consists in]:

[--]determining the first transport packet TP of the first-program video component present after the switch command and including [comprising] a random access indicator RAI set at 1 in order to determine the time of switching onto the second program,

[--]switching onto said second-program video component and replacing the transport packets TP of said video components with stuffing transport packets until the appearance of the following transport packet TP of which the PUSI indicator is set at 1,

[--]if the RAI indicator is set based on this transport packet and after the PES packet header, then replacing the payload data of each transport packet of this component with the replacement picture data, and when all the replacement picture data have been inserted in the payload of the video component transport packets TP,

substituting the payload data of the following transport packets TP of the component with video stuffing [such as '00 octets] until the appearance of the next transport packet of this second-program video component of which the PUSI indicator is set at 1, this transport packet TP being excluded,

[--]then restarting the preceding stage on the basis of this transport packet TP with the PUSI indicator set at 1 until the appearance of the next transport packet TP of the second-program video component of which the random access indicator RAI is set at 1, this transport packet being excluded, and

[--]setting the discontinuity indicator DI at 1 on this packet with the random access indicator RAI, which corresponds to the end of replacement and to the effective beginning of the second program video.

15. The [M]method of [as claimed in one of] claim[s] 12[, 13 or 14,] wherein for the case of one or both video components being devoid of a random access indicator RAI set in the transport stream, the following steps are performed[characterized by consisting in]:

[--]determining the transport packet TP of the video component of the stream(s) without RAI indicator of which the PUSI indicator is set at 1 and of which the payload data begin with a video sequence header,

[--]searching for the sequence header following the switch command,

[--]setting the discontinuity index in the determined transport packet TP if the latter comprises an adaptation field AF with a program clock reference PCR when the component carries the program clock,

[--]or if the determined transport packet TP does not comprise an adaptation field AF or if the program clock carrying component is involved and the adaptation field AF lacks a clock reference PCR, replacing the determined transport packet TP with a specific transport packet TP called the inserted transport packet, and shifting the replaced transport packet TP as well as the following transport packets TP of this video component in the transport stream until one of them can be inserted into a stuffing transport packet TP.

16. The [M]method of [as claimed in] claim 15[, characterized in that] wherein the inserted transport packet includes [exhibits] the following characteristics:

[--]the PUSI indicator is set at 0,

[--]the status of the continuity counter COMP is set at that of the continuity counter of the initial transport packet TP less 1,

[--]the control field AFC of the adaptation field AF is set at the binary value 10, denoting the presence of an adaptation field AF in this transport packet TP, but no payload,

[--]the discontinuity indicator DI situated in the adaptation field AF is set at 1,

[--]if the video component carries the program clock, a program clock reference PCR calculated on the basis of the preceding clock reference(s) PCR of the same component is set into the adaptation field.

17. The [M]method of [as claimed in] claim 15, for the case of a presentation stamp PTS being present in the header of the PES packet including [containing] the sequence header, further including [characterized in that it consists in] pre-processing the setting of the random access indicator RAI, [,] said transport packet TP being inserted to set the random access indicator RAI then includes [exhibiting] the following characteristics:

[--]the PUSI indicator is set at 0,

[--]the status of the continuity counter COMP is set at that of the continuity counter of the initial transport packet TP, less 1,

[--]the control field AFC of the adaptation field AF is set at the binary value 10 denoting that an adaptation field AF is present in this transport packet TP but no payload,

[--]the RAI indicator situated in the adaptation field AF is set at 1,

[--]the discontinuity indicator DI situated in the adaptation field is set,

[--]if the video component carries the program clock, a program clock reference PCR calculated on the basis of the preceding clock reference(s) PCR of the same component is moved into the adaptation field AF.

18. The [M]method of [as claimed in] claim 15, for the case of a [the] presentation stamp being absent from the header of the PES packet containing the sequence header, further including [characterized in that it consists in] pre-processing the setting of the RAI indicator, [in that] modifying the initial transport packet TP [is modified] in such a way that its PUSI indicator is set at 0 and the useful data are eliminated from the PES packet header, said transport packet TP inserted to set the RAI indicator then including [exhibiting] the following features:

[--]the PUSI indicator is set at 1,

[--]the status of the continuity counter COMP is set at that of the continuity counter of the transport packet TP less 1,

[--]the control field AFC of the adaptation field AF is set at the binary value 11 to denote that an adaptation field AF and a payload are present in this transport packet,

[--]the adaptation field AF comprises an RAI indicator set at 1,

[--]the discontinuity is set at 1 on this packet with RAI indicator,

[--]a program clock reference PCR calculated on the basis of the preceding clock reference(s) is set in the adaptation field AF if the video component carries the program clock,

[--]a presentation stamp PTS is calculated and moved into the payload of this packet,

[--]the PES packet header which was in the replaced transport packet TP is shifted into the payload of this inserted transport packet TP and in case of the absence of the presentation stamp PTS from the PES packet header, this PTS stamp shall be calculated and set in the header data of this PES packet.

Serial No. sn

ABSTRACT OF THE DISCLOSURE

T[he present invention relates to a method for switching t]he video component(s) of a digital audio-visual first program are switched onto the video components of a second digital, audio-visual program[.] by

[In the invention, said method is characterized in that it consists in] (a) switching onto the video component of the second program, subsequent to the switch command and to the end of a picture of the first program, and (b) [in] replacing, as seen in the order of transmission, each non Intra picture of said component of a [said] second program, with a picture having [of which the] coding performed [is carried out] independently of (a) the picture data of the replaced picture and (b) of the contents of the pictures to which it refers until the beginning of the next Intra picture of the [said] component of the [said] second program.